

REMARKS/ARGUMENTS

Favorable reconsideration of this application in view of the above amendments and in light of the following discussion is respectfully requested.

Claims 1-7, 10, and 11 are pending. Claims 1-7 and 10 are amended. New Claim 11 is submitted. No new matter is added.

In the outstanding Office Action, Claims 1-5 and 10 were rejected under 35 U.S.C. § 102(e) as anticipated by Funaki (U.S. Patent Publication No. 2003/0205202); Claim 6 was rejected under 35 U.S.C. § 103(a) as unpatentable over Kim (U.S. Patent Publication No. 2003/0070617) in view of Cook (U.S. Patent Publication No. 2003/0049372); and Claim 7 was rejected under 35 U.S.C. § 103(a) as unpatentable over Funaki in view of Carpenter (U.S. Patent Publication No. 2004/0089233).

Claims 1-7 and 10 are amended. These amendment find support in the specification as originally filed and therefore do not raise a question of new matter.¹

New Claim 11 is submitted. New Claim 11 finds support in the specification and claims as originally filed and therefore does not raise a question of new matter.²

The rejections of Claims 1-5 and 10 under 35 U.S.C. § 102(e) as anticipated by Funaki and of Claim 7 under 35 U.S.C. § 103(a) as unpatentable over Funaki in view of Carpenter are traversed.

The present invention, as recited in independent Claims 1, 7, and 10, relates to a processing device. The processing device includes a chamber defining a processing area; a mounting table, disposed in the chamber, for mounting thereon an object to be processed; a gas supply port for supplying a gas into the chamber, the gas supply port being provided at a surface of the chamber; and a shower head fitted in the gas supply port and having a plurality of gas supply openings at an its surface exposed to an inside of the chamber. Each of Claims

¹ See the specification as originally filed at page 12, line 10 to page 13, line 25, for example.

² See the specification as originally filed at page 23, line 12 to page 24, line 18, for example, and Claim 6 as originally filed, for example.

1, 7, and 10 further recite that *the plurality of gas supply openings are provided substantially throughout the exposed surface of the shower head*. By employing the claimed configuration, the stagnation of gas can be prevented at an area near the gas supply port, and the gas can be supplied to the entire surface of the object to be processed. As discussed in Applicants' specification, since the stagnation of gas is decreased, the change of the atmosphere in the chamber becomes easy, so that the gas change is performed at a high speed.³

Turning to the applied references, Funaki describes a plasma CVD device. As illustrated in Figure 1, the plasma CVD device includes a vacuum container (200) that includes a gas dispersion plate (213) that is formed a plurality of gas dispersion holes (214).⁴ The discharge surface on the edge of the gas dispersion plate (213) is fashioned in such a manner that it becomes progressively broader as it proceeds downwards.⁵ This discharge surface is divided into two in the shape of a ring around the centre axis of the gas dispersion plate (213).⁶ The inner discharge surface (1a) is fashioned horizontally, while the outer discharge surface (2a) is fashioned in such a manner as to form an angle in excess of 90 degrees to the inner discharge surface (1a).⁷ However, Funaki fails to describe or suggest a plurality of gas supply openings that are provided *substantially throughout the exposed surface of a shower head*.

As illustrated in Figure 1, Funaki describes that a ring-shaped insulator (300) formed of alumina or a similar substance is attached to the horizontal section (1a) of the discharge surface on the edge of the gas dispersion plate (213).⁸ Funaki states that "insulation of the horizontal section 1a of the discharge surface on the edge of the gas dispersion plate 213 is implemented with the aid of an insulator 300 makes it possible to enhance the effect of inhibiting discharge in

³ See the specification as originally filed, for example, at page 19, lines 10-14.

⁴ See Funaki, at paragraphs 56-58.

⁵ See Funaki, at paragraph 63.

⁶ See Funaki, at paragraph 63.

⁷ See Funaki, at paragraph 63.

⁸ See Funaki, at paragraph 65.

the neighbourhood of the treatment substrate W as compared with insulation through insulation treatment.”⁹ However, as can be seen in Figure 1, attaching the ring-shaped insulator (300) to the horizontal section of the discharge surface (1a) *limits* a surface for forming gas dispersion holes (214) to *a middle portion* of the horizontal section of the discharge surface (1a). Limiting gas dispersion holes (214) to *a middle portion* of the horizontal section of the discharge surface (1a) is not a plurality of gas supply openings that are provided *substantially throughout the exposed surface of the shower head*.

Carpenter fails to cure the deficiency in Funaki. Specifically, Carpenter fails to describe or render obvious *a shower head fitted in* a gas supply port in the claimed configuration. As illustrated in Figure 1, Carpenter describes an apparatus (10) that includes an inlet port (32) extending through a microwave source (14).¹⁰ A gas dispersion plate (36) is provided beneath the inlet port (32).¹¹ The plate (36) has a plurality of openings extending therethrough to allow gaseous material to flow through the gas dispersion plate.¹² However, *a dispersion plate provided beneath* an inlet port is not a shower head fitted in a gas supply port and having a plurality of gas supply openings at an its surface exposed to an inside of a chamber.

Accordingly, even the combined teachings of Funaki and Carpenter fail to disclose or suggest the features of amended independent Claims 1, 7, or 10. It is submitted that amended independent Claims 1, 7, and 10, and Claims 2-5 depending from Claim 1, are in condition for allowance.

The rejection of Claim 6 under 35 U.S.C. §103(a) as unpatentable over Kim in view of Cook is also traversed.

⁹ See Funaki, at paragraph 87.

¹⁰ See Carpenter, at paragraph 34.

¹¹ See Carpenter, at paragraph 36.

¹² See Carpenter, at paragraph 36.

Claim 6 relates to a processing device. Claim 6 recites that the processing device includes a chamber defining a process area and a mounting table. In a substantially vertical cross section of the chamber, a sidewall of the chamber defining the processing area and abutting on the surface of the chamber forms an angle greater than 90° with the surface of the chamber and extends close to the mounting table. Claim 6 further recites that *the mounting table has a mounting surface for mounting thereon the object to be processed and a side surface forming an angle greater than 90° with the mounting surface*. As discussed in Applicants' specification, such a configuration may decrease the occurrence of gas stagnation near the side of the mounting table.

Neither one of Kim or Cook describes or suggests a mounting table with the claimed configuration. Turning first to Kim, Figure 1 illustrates a conventional atomic layer deposition apparatus that includes a feeder (1) for feeding a plurality of reactive gases alternately, a susceptor (3) for receiving wafers (2), and a chamber (4) for housing the susceptor (3), where the reactive gases fed from the carrier (1) are deposited onto the wafers (2).¹³ However, the susceptor (3) does not include a mounting surface for mounting thereon the object to be processed *and a side surface forming an angle greater than 90° with the mounting surface*.

With respect to Cook, Figure 3 illustrates a substrate (28) that is placed in a vacuum chamber (29) onto a rotatable pedestal (30).¹⁴ Reactant gases (35) enter the vacuum chamber (29) from port (36) and exit through port (37).¹⁵ However, the rotatable pedestal (30) does not include a mounting surface for mounting thereon the object to be processed *and a side surface forming an angle greater than 90° with the mounting surface*.

¹³ See Kim, at paragraph 29.

¹⁴ See Cook, at paragraph 7.

¹⁵ See Cook, at paragraph 7.

Accordingly, even the combined teachings of Kim and Cook fail to disclose or suggest the features of amended Claim 6. It is submitted that amended Claim 6 is in condition for allowance.

New Claim 11 relates to a processing device. Claim 11 recites that the processing device includes a chamber defining a processing area; a mounting table, disposed in the chamber, for mounting thereon an object to be processed; and a gas supply port for supplying a gas into the chamber. The gas supply port is provided at a surface of the chamber and the mounting table is disposed substantially parallel to a flow direction of the gas supplied from the gas supply port. Claim 11 further recites that, *in a substantially horizontal section of the chamber, a sidewall of the chamber defining the processing area and abutting on the surface of the chamber forms an angle greater than 90° with the surface of the chamber and extends close to the mounting table.*


None of the cited references disclose or suggest that, in a substantially horizontal section of a chamber, a sidewall of the chamber defining the processing area and abutting on the surface of the chamber forms an angle greater than 90° with the surface of the chamber and extends close to the mounting table. Accordingly, it is believed that Claim 11 is in condition for allowance.

For the reasons discussed above, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. Therefore, a Notice of Allowance for Claims 1-7, 10, and 11 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.


Steven P. Weihrouch
Attorney of Record
Registration No. 32,829

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)